Development of Site Profiles

Y-12 National Security Complex
Oak Ridge National Laboratory

Bill Murray
Oak Ridge Associated Universities Team

November 8-9, 2004

Energy Employees Occupational Illness Compensation Program Act (EEOICPA)

EEOICPA – Department of Labor Two Types of Claims

- Subtitle B
  - $150,000 + medical expenses
  - Radiation-induced cancer

    Beryllium disease
    Silicosis
  - Radiation claims go to NIOSH for dose reconstruction

    (***This is what we are here to talk about.)***

- Subtitle E
  - $150,000 + medical expenses
  - Exposure to toxic chemicals
  - Can apply for both programs; no offset in benefits
  - Ombudsman

NIOSH – National Institute for Occupational Safety and Health

Office of Compensation Analysis and Support (OCAS)

Contractor – Oak Ridge Associated Universities (ORAU) Team

Significant Dates

- December 2000: EEOICPA signed into law.
- July 2001: Department of Labor (DoL) began accepting claims.
- September 2002: ORAU Team awarded contract to support radiation dose reconstruction.
- Amended October 2004: all claims go to Department of Labor.

Purpose of This Meeting:

- Discuss the Site Profiles for the Y-12 Plant and the Oak Ridge National Laboratory.
- Describe what the Site Profile is used for.
- Ask for your suggestions and information.
- Document your concerns and issues.
- Answer your questions.

The Site Profile Supports Dose Reconstruction

The Site Profile:

- Is used by radiation specialists (Health Physicists) to reconstruct radiation doses.
- Provides site-specific technical information.
- Minimizes the interpretation of data.
- Is revised as new information comes to light.

Contents of the Site Profiles

The Site Profiles have sections on:

- Site Description
- External Dose
- Internal Dosimetry
- Occupational Environmental Dose
- Occupational Medical Dose

The Site Profile Teams

- The Teams were established in May 2003.
- The Team Leaders are Bob Burns (ORNL) and Bill Murray (Y-12).
- Both Site Profiles are completed and have been approved by NIOSH.
- Site Profiles are on the NIOSH website at:

http://www.cdc.gov/niosh/ocas/ocastbds.html#x10

http://www.cdc.gov/niosh/ocas/ocastbds.html#y12

Site Description

- Provides an overview of the facilities and activities at ORNL and Y-12 since 1943.
- Documents the radioactive materials and radiation sources at the sites.
- Identifies potential radiation exposures from occupational, environmental and medical radiation sources.

ORNL Site Description

- R & D laboratories
- Isotope production
- Several reactors and accelerators
- Spent fuel reprocessing
- Waste processing and storage
- Radionuclides – mixed fission and activation products, uranium, transuranics, noble gases
- Several accidents/incidents

Y-12 Site Description

- Uranium isotope separation
- Nuclear weapons component fabrication
- Storage of enriched uranium
- Weapons research
- Decontamination and decommissioning of unused buildings
- Environmental and waste management
- Work for others
- Criticality accident

Occupational External Dosimetry

We include information on:

- Sources of exposure
- Methods and practices
- Adjustments to recorded dose
- Minimum detectable levels (MDLs)

External Dosimetry - ORNL

- Dosimeter technology

  Beta, gamma, and x-ray – 1943 to present

  Neutrons – 1945 to present
- Exchange frequency
- Workplace radiation fields
- Worker locations around sources

External Dosimetry – Y-12

- Dosimeter technology
  - Beta, gamma, and x-ray – 1948 to present
  - Neutrons – 1950 to present
- Exchange frequency
- Workplace radiation fields
- Worker locations around sources

Occupational Internal Dosimetry

We include information on:

- Methods and practices.
- Sources of exposure.
- Minimum detectable activity (MDA) for:
    - Whole Body Counting
    - Urinalysis
- Reporting levels

Internal Dosimetry - ORNL

- Bioassay program started in 1947.
- Urine and fecal samples were analyzed for selected radionuclides including fission products, uranium, transuranics.
- Gamma-emitting radioactive materials were measured inside the body with whole body and lung counters starting in 1959.

Internal Dosimetry – Y-12

- Urinalysis – began in 1948
  uranium, plutonium, tritium, americium, neptunium, thorium
- Fecal analysis – began in 1960s
  uranium
- Chest counting – began in 1961
  uranium, thorium, neptunium, cobalt, zirconium

Occupational Environmental Dose
(for workers who were not monitored)

Workers who are not monitored can still be exposed to radiation on site from:

- Radioactive materials in the air.
- Radiation sources in buildings.
- Radioactive materials in the work environment.

Environmental External Dose

- The external radiation dose results from radiation sources inside buildings, radioactive wastes, storage, etc.
- Site-wide monitoring data are used to calculate the external dose for unmonitored workers.
- The average annual exposure rate ranged from 0.03 to 0.46 mR/h from 1944 to 2003 at ORNL.
- Limited data show the mean dose rate at Y-12 was 0.013 mrem/h.

Environmental Internal Dose

The annual intake of radioactive material is calculated from the average annual air concentration.

- Radionuclides at ORNL are ^{3}H, ^{131}I, and mixed fission products.
- Radionuclides at Y-12 are $^{234,\ 235}U$ and ^{238}U.

Occupational Medical Dose (X rays)

- Frequency of employer-required x rays.
- X-ray equipment and techniques used.
- Use this information to reconstruct radiation doses.

Occupational X-ray Dose (Cont.)

- Only chest x rays required by the employer are included. (Lumbar spine x rays were taken at ORNL only in the early 1950s).
- The x-ray equipment changed over time.
- Older equipment gave off more x-ray radiation resulting in higher doses.

In Conclusion

- Developing a usable Site Profile is an important task.
- The Site Profiles can change based on your input.

Send Comments on Site Profiles Directly to NIOSH

National Institute for Occupational Safety and Health (NIOSH)
Robert A. Taft Laboratories MS-C34
4676 Columbia Parkway
Cincinnati, OH 45226

Fax: (513) 533-8230

email: siteprofile@cdc.gov

NIOSH Office of Compensation Analysis and Support Website

http://www.cdc.gov/niosh/ocas